

**West's Road RDF & Waste Management  
Community Reference Group  
AOC  
Special Meeting to discuss a 'hot spot' in Cell 4A  
Final Summary Notes**

21 November 2016

RDF Meeting Room

**Present:**

Karen Hucker – community representative  
Harry Van Moorst – WREC representative  
Julian Menegazzo – adjoining landowner representative  
Jacqui Scott - community representative  
Cr Walter Villagonzalo – Councillor  
Michelle Lee – Planner, Metropolitan Waste and Resource Recovery Group (MWRRG)  
Stephen Thorpe – Director City Operations  
Simon Clay – Manager Refuse Disposal Facility  
Bruce Turner – Independent Chair

**Visitors:**

Nick Simmons - EPA

**Apologies/ absent:**

Cr Peter Maynard – Councillor  
Cr Henry Barlow – Mayor  
Cr Tony Hooper – Councillor  
Kimi Pellosis – Community representative  
Peter Haddow – Community representative  
Lindsay Swinden – Community representative  
John Faranda – Werribee South Ratepayers Association representative

The meeting commenced at 11.30 am. No conflicts of interest were declared

**1. Welcome and Introductions**

Bruce welcomed everyone and facilitated introductions. He outlined the purpose of the meeting which was to provide an opportunity to better understand the data on the hot spot, the implications of this data, and further work to be done, as well as to determine what communications would be helpful, and what these should include. There was also an opportunity to visit the site of the hot spot.

Bruce encouraged even participation and any questions that people had.

**2. Topics discussed**

*Background to and data on the hot spot*

Simon outlined how the hot spot had come to be found during remediation works on Cell 4A (reprofiling side batters).

There was discussion of the elevated temperatures that had been found with temperature probes. Nick explained that the injection wells that had been subsequently drilled had shown much lower temperatures (55°C) possibly due to the disturbance of the material around the holes which could have allowed heat to dissipate.

Nick shared his experience of hot spots in landfills in the UK; ones that he said represented 'worst case' scenarios with burning occurring close to the surface or with much greater air ingress than at the RDF. He said he in contrast, the RDF was deeper and cooler with very, very little gas escaping at the surface. In response to questions about safety and other risks to human health raised by Julian, Nick said he would stake his professional reputation on there being no chance of an explosion occurring as a result of the RDF hot spot. He undertook to provide his professional view in writing.

**ACTION 1: Nick Simmons (EPA) to provide an email to the CRG (via Simon or Bruce) stating his professional view that the hot spot poses no health and safety dangers (in response to questions/concerns regarding the potential to explode or produce hazardous emissions)**

Harry queried the definition of 'hot spot', saying that anything over 80-100°C was probably a hot spot. He said this definition would make the RDF hot spot much more extensive in area/ volume.

Walter asked if this had happened before at the landfill. Simon said it had not, and was likely to be a one-off as the result of Cell 4A being unique in the initial steepness of its batters. Nevertheless, the possibility of it happening again could not be ruled out.

*Options for dealing with the problem* (NB input from summary notes prepared by Harry are acknowledged and used extensively in this section)

Several options for dealing with the problem were discussed. Nick said that removing oxygen from the hot spot was not sufficient; the temperature had to be reduced. Options for doing this were outlined:

**1. Pumping water or leachate to cool and suffocate the fire.**

Nick said millions of litres would be required. This raised the question of what the impact might be of adding bulk water on a 200°C hot spot. The suggestion that this could cause lateral and vertical cracking and/or emissions were considered to be very unlikely by Nick. Several diagrams were drawn on the white-board to explain why the relative gas pressures, along with the capping and well seals would prevent any emissions.

The concept of using leachate (contaminated water within the waste and the leachate ponds) was opposed by several community members because of a concern that it could lead to the release of volatile contaminants, potentially including dioxins and other contaminants dangerous to human health. Nick responded was that this wouldn't happen as long as the process was managed correctly.

**2. Pumping liquid nitrogen or CO<sub>2</sub> to cool and suffocate the fire.** This raised the issues of additional delays while the appropriate piping, etc. was put into place and the liquid CO<sub>2</sub> was sourced. It was also mentioned that this would be far more expensive than using water. Nick spoke about his experience of using different methods to extinguish hot spots and said the use of N or CO<sub>2</sub> would not provide any additional benefit, or be any more effective or safe, than water or leachate.

**3. Excavation of the hot spot** and treating away from the landfill (e.g. in another part of the quarry). This was rejected by all present due to the risks of odour, injury and spreading the fire due to oxygen ingress.

Both Nick and Simon indicated that the preferred option was to inject with water and/or leachate. There was considerable discussion of the evidence of risks, and what would happen with all the leachate that would be pumped through Cell 4A. Simon said it would take a while to drain down through the cell and then would be pumped out from the leachate sumps. He said the leachate pond is being emptied (by trucks) to provide additional capacity in the pond.

Jacqui asked how the costs would be covered; did this come from rates? Simon and Stephen indicated that the costs would come from RDF revenue, not from rates. Stephen indicated that the relative costs/ benefits of the treatment options were a consideration for Council in determining, on advice from EPA, the best approach to controlling the hot spot.

Harry was asked to provide his considered thoughts on the question of water vs leachate use.

**ACTION 2: Harry Van Moorst to provide his further thoughts on the merits/ issues with the use of water and/ or leachate for cooling the hot spot (as recommended by Nick Simmons)**

As a final thought on this matter, Bruce asked if the RDF had a supply of fresh water. Simon said there was a dam with water available. Bruce proposed a possible compromise of use of this cleaner water for the first contact with the hot spot, followed by leachate as it cooled (and the supply of fresh water was depleted). He wondered if this might allay some concerns about fugitive emissions from contact of the water with the hot spot.

#### *Key messages about the situation*

There was some discussion of key points that could be made and how they might be shared with the local and wider community.

**ACTION 3: Stephen Thorpe to take the key messages about the hot spot that were discussed at the meeting, seek the advice of Council's communications team on the format and avenues for public release of these, and circulate the results of this advice to the CRG – ideally this should happen this week**

#### *Monitoring*

Harry said he felt there should be substantial monitoring of air quality during the process to extinguish the hot spot to assure the community that there were no "fugitive emissions" of contaminants. In view of the difficulties of such monitoring on a timely basis, Nick initially suggested that monitoring of methane could be used as a surrogate for other gases. He later came up with the suggestion that safety monitors (alarms) could be worn by employees involved in managing the hot spot and related tasks near the hot spot. The question was raised as to whether these could record monitoring results, rather than simply alarm if limits were breached. It was agreed that this would be followed up by Simon.

**ACTION 4: Simon to investigate how best to achieve credible and effective monitoring of air emissions in the vicinity of the hot spot before, during and after the treatment of it (building on the monitoring work already reported to the CRG).**

The Meeting closed at 1:30 pm and was followed by a tour to the top of Cell 4A and the site where the injection wells had been drilled, and to view the core samples from the wells.

## Responses to actions (to 1 December 2016)

### Action 1: (22/11/16)

Simon / Bruce. As promised below is a statement of opinion on the hotspot at Werribee landfill - in numbered paragraphs for ease.

1. There is no doubt that a hotspot exists, there seemed to be slight doubt as to whether I thought there was during the meeting. I have observed gas temperatures confirming a hotspot. I monitored the gas balance in the impacted area and observed results typical of hotspot conditions and air ingress into the waste.
2. The hotspot is minor, it is not deep seated, laterally extensive or of a very high temperature. It is 3 times cooler than the hottest I have dealt with and under half the maximum temperature of the majority I have dealt with – which are generally 450 – 550 Celsius.
3. My observations of the drill cores yesterday confirmed there were minor horizons of charred material and material which appeared to have been exposed to high temperature. It is my opinion that Council's observations of the 'fresh' cores misinterpreted well degraded waste as charred, which has over estimated the amount of charred horizons reported in Council's visual analysis of the cores. This supports point 2 that the hotspot is minor.
4. I have never witnessed a hotspot explode or emit significant quantities of methanogenic and pyrolytic gases to atmosphere. It is therefore my opinion that an explosion will not occur. As the CRG witnessed yesterday while walking directly over the top of the hotspot area, there are no emissions to atmosphere of smoke or ash or any venting of landfill gas or pyrolytic gases (Carbon Monoxide, Hydrogen, CO<sub>2</sub>). This was further reinforced by the lack of any landfill gas or burning odours, as well as Council's landfill gas surface emission monitoring results, which I recommended they undertake. It is also worth noting when considering the air emissions of this hotspot that the only reason the CRG knows about its existence is that the CRG was informed of it by Council.
5. In the many hotspots I have extinguished, assisted in extinguishing or observed being extinguished water and leachate (which by volume and weight is mainly water) have been successful in cooling the hotspot material. Water readily takes on and transmits thermal energy as it evaporates, using ~2500 kJ/Kg in the phase change, much more so than Nitrogen at ~200 kJ/Kg and Carbon Dioxide at ~575 kJ/Kg. For these reasons I advocate its use – I have seen it work and the physics supports why. Harry's review of published papers will not change these salient facts. In using water, a close eye must be kept on leachate control and I am confident Council is prepared for this.
6. I am satisfied with the investigation work done by Council and their proposals to extinguish the hotspot.
7. The concern from this hotspot is that Council is non-compliant their licence for surface emissions of methane in cell 4A – the impact is therefore emissions of greenhouse gases. As mentioned earlier this is because a gas extraction system cannot be run while a hotspot remains in the waste, as the hotspot will extend with a gas system in use.

### Nick Simmons BSc (Hons)

Principal Expert - Landfills

Senior Field Specialist - Landfills

Specialist Regulatory Services

Environment Protection Authority Victoria

### Action 2: (23/11/16)

Hi,

Attached is my report on the meeting re the tip fire/hot spot held on Monday. It is a brief report based on my memory (never infallible!). I've tried to remain objective but, as I've noted, I felt that there was a degree of complacency about the risks entailed in such a hot spot and entailed in the methods considered for extinguishing it. However, there is no one method that guarantees success and advice varies considerably from different sources, including various Environment Protection Agencies. My concern is to ensure that we take the least risky rather than the cheapest option to

extinguish this subterranean fire and that we monitor all risks (however slight some people might consider such risks to be) as comprehensively and accurately as we can. This should include:

1. Effective air quality monitoring throughout the next few months including proper and frequent bag sampling for analysis by accredited labs and testing for a range of substances including Hydrogen, Carbon Monoxide, Carbon Dioxide, Methane, Hydrogen Sulphide and at least one dioxin monitoring location;
2. Leachate should not be used (as clearly indicated by several “experts” as well as discouraged by our EPA BPEM);
3. If water is to be used then it should be supplemented by a suitable suppression agent as recommended by the California Dept. of Recycling and Recovery (referenced in the attached report);
4. The next round of temperature probes and/or wells should drill down to approx 24m rather than arbitrarily cease at 15m. This is necessary in order to gauge the actual extent of the fire and the potential for serious damage to the base liner and leachate system that might have occurred;
5. The current Fire Contingency Plan must be updated (as required by EPA’s new Licencing Guidelines) to include subterranean fires or hot spots (currently only considers surface fires and this should be informed by the current steps being taken and their effectiveness (as evidenced by monitoring and temperature testing, etc.) – this might also provide a useful Australian case study of managing such landfill fires;
6. There needs to be additional scrutiny of the monitoring results from the various wells and other monitoring points to provide earlier warnings of the development of hot spots throughout the landfill.

I also want to stress that the landfill management in consultation with EPA, took all appropriate steps once the hot spot was discovered, especially the step of ceasing gas extraction to avoid further oxygen ingress. It may eventuate that this, combined with the additional soil/clay cover, will suffice to bring the temperature down and we should be thankful for their rapid action. However, there are no guarantees with such fires and further steps must be taken to ensure there is no ongoing risk from this or similar fires. It is important that the community is informed and regularly updated, possibly via the CRG, about progress with the extinguishing of this fire.

As a matter of courtesy I have copied all members of the CRG and Nick Simmons from EPA into this email and Report – some will undoubtedly wish to disagree with my comments.

Please keep this confidential and enable Council to indicate how they want to inform the community of the situation.

Cheers,

Harry

Harry van Moorst

Director

Western Region Environment Centre

*(NB the report referred to above was circulated in confidence to the CRG – it is not attached to these summary notes)*

### **Action 3: (24/11/16)**

Dear CRG

Further to our meeting on Monday the key communication messages that have been provided to our Comms team for briefing of the media are summarised below. The advice from our Comms team is to provide a verbal (direct) briefing to the media, so this is what is being planned at this stage.

- Council has detected that there is a hot spot in one of the filled cells at the landfill. This was found when some remediation works were being done on Cell 4A and some of the cover material was removed to commence reprofiling the side batter (slope) on the west side of Cell 4A. An area of charred waste was uncovered which started smouldering upon contact with air. This was immediately extinguished with water and the area dug out and further water applied.
- To define the extent of the hot spot a temperature probe was used to measure temperature at different depths in Cell 4A. This work confirmed the hot spot was still present, although the extent appears to be relatively small. The temperatures measured were in the range 100-200 degrees Celsius with some spikes up to 250 degrees Celsius being measured at one location.
- Council has now drilled a number of wells in the area of the hot spot. These wells will be used to inject liquid into the zone around/at the hot spot to extinguish it.
- Monitoring of surface air quality (methane, carbon dioxide, carbon dioxide and hydrogen sulphide) has been undertaken and indicates no impact on air quality. Monitoring will continue on a regular basis throughout the works to extinguish the hot spot.
- Hot spots are not uncommon in landfills and this one may have started from excessive air ingress into the landfill, resulting in a change from the usual anaerobic conditions to aerobic conditions and localised increase in temperature and then to combustion. The combustion is occurring in a very low oxygen environment and there are no signs of any combustion at the surface of the landfill.
- Injecting liquid into the area of the hotspot is expected to commence in 1-2 weeks and will be undertaken for at least 4 weeks. Temperature monitoring using a temperature probe will then be redone to confirm the hot spot has been extinguished. A return to normal landfill temperature of around 55 degrees Celsius would indicate the hot spot has been extinguished.
- Council has kept EPA informed of the hot spot and EPA has provided assistance and advice on management and extinguishment of the hot spot.
- EPA considers the hotspot to be a very low risk to people working on site or living in the area surrounding the landfill.
- EPA has indicated it is satisfied with both the investigation work undertaken by council and the proposed method for extinguishing the hot spot
- The hot spot needs to be extinguished so that Council can operate the landfill gas extraction system effectively and meet its licence obligations for surface emissions of methane from Cell 4A
- Council has also briefed the Community Reference Group. Members of the CRG have provided input into the management of the hot spot and monitoring to be undertaken while the hot spot is being extinguished.

regards

Simon Clay  
RDF Manager

### **Action 4: (yet to be completed/ reported on)**